

non-sexual nature of unicellular organisms—tacitly assumed by the author—must be considered in an analysis of this sort. The majority of Protozoa present sexual phenomena in their life-histories, and sexual processes also occur in many yeasts. Although we believe that the Bacteria are truly non-sexual, we think that the possibility of amphimictic processes occurring in this group should at least have been considered, as a certain amount of work has already been published in this connection.

C. CLIFFORD DOBELL.

BIOCHEMISTRY OF FATS.

Monographs on Biochemistry. Edited by Prof. R. H. Aders Plimmer and Dr. F. G. Hopkins, F.R.S. The Fats. By Prof. J. B. Leathes. Pp. ix+138. (London: Longmans, Green and Co., 1910.) Price 4s. net.

PROF. LEATHES'S former book on the "Problems of Metabolism" proved him to be a writer with originality in his views and a capacity for stating them in a lucid and convincing manner. One therefore turned to his long-promised monograph on the fats with considerable interest, especially as the subject is one to which he has devoted so much experimental research work.

The first hundred pages are devoted to a description of the chemistry of fats and their constituents, and the various methods for separating, identifying, and analysing them. This section of the book is useful and necessary; the facts, moreover, are clearly put and well arranged. But this laying of the foundations affords little scope for the thinker, and no doubt could have been equally well done by any competent chemist. The real interest of the book is the superstructure built upon this, namely, the chapter on the physiology of the fats, and one's only regret is that it occupies only eighteen pages. Here the author is able to display his gift of making the dark ways of metabolism as plain as is possible with our present knowledge, and in suggesting explanations and stimulating research on the questions which are still largely hypothetical.

One word of criticism of a quasi-adverse kind appears to be necessary, and that relates to what, after all, is not the most important matter, namely, that of nomenclature. The Chemical Society has laid down certain rules for nomenclature in order to ensure uniformity among English-speaking chemists; such terminations as in, ine, ol, ole, ase, &c., have definite meanings assigned to them, and surely all writers should endeavour to follow the laws put forward by the society, which occupies the foremost place in the chemical world. Prof. Leathes, however, speaks of lecithine, cerebrone, nucleine, jecorine, &c., and the substance he terms phlorrhizine is recognisable, though this spelling does not occur so far as one knows in any other English chemical book.

He has also introduced an entirely new nomenclature for the principal lipoids, the phosphatides being dubbed phopholipines, the galactosides galactolipines, and the basic constituents of galactosides lipines.

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A new nomenclature is always sure to cause confusion, especially among students, and so should never be introduced without careful consideration and with some prospect that it will at once "catch on," because it is manifestly appropriate. Prof. Leathes has no doubt very carefully considered his new terms, and everyone will agree with him that the existing terminology leaves much to be desired; but it is very doubtful whether his new terms are better than the older provisional names. The chemical constitution of most of the substances in question is still a matter of doubt and speculation. The proper time to introduce new names will be when their constitution is fully known, and terms can then be framed which will express their structure with accuracy. At present Prof. Leathes has only introduced a new set of provisional names, which, like the older ones, will disappear when our knowledge is more exact.

W. D. H.

BIRD OBSERVATION.

Unleitung zur Beobachtung der Vogelwelt. By Dr. Carl Zimmer. Pp. iv+134. (Leipzig: Quelle and Meyer, 1910.) Price 1.25 marks.

THE author of this work is Dr. Zimmer, keeper of the Royal Zoological Museum in Breslau. On the first zoological excursion he undertook with his pupils in the university of that town (where he is also lecturer, as well as museum custos) they fell in with a chaffinch singing in a tree. On his demanding from them the name of the songster, the word "nightingale" was ventured on after a prolonged silence! The little episode, which indicated, to his surprise, their lamentable lack of knowledge of the commonest local birds, induced Dr. Zimmer to prepare this *büchlein* as an introduction to ornithological observing. In some respects it reminds one of the section in "Hints to Travellers," issued by the Royal Geographical Society on the same subject, though directed to a somewhat different class of observers. One, however, lays the book down with the somewhat unsatisfactory feeling that it is assumed that the student will be *made* into an ornithologist by following the instructions—all of them excellent and the result of experience—therein contained, rather than that the observer, who must be born so, and is already, if that be his bent, an ornithologist, in embryo, before he is aware of it, requires proper guiding only.

Many of Dr. Zimmer's hints will assist in directing the young ornithologist's earlier methods, and suggesting interesting lines of observation, and so will be of considerable value. After some words of introduction, the author gives a list of helpful books on ornithology, especially those with good illustrations, in English as well as German. His next section deals with the subject of excursions into "the open" in quest of birds in their wild state—"the study of cage birds is a make-believe"—and the periods of the day when they can be observed to most advantage. The most suitable field-glasses for the purpose are described.

The larger portion of the book discusses bird life at the different seasons of the year, and directs atten-

tion to what should specially be observed during each of them. In spring to love-making, song, and nidification, in summer to incubation, nestlings, with their succession of plumages, and in autumn and winter to the congregating of birds in flocks, and to migration and the migratory instincts and such like. A further section is devoted to the added help to field observations to be obtained from the study of cage birds, and to the protection of birds by artificial nests, and in protected woods. The formation of collections, the methods of preserving eggs, skins, and skeletons, the description of the proper instruments for the purpose, and suggestions on the making of anatomical, systematic, faunistic, and specific observations occupy the penultimate sections. The final pages supply some hints on bird observation abroad.

The volume is illustrated by excellent blocks, many of them being reproductions of Kearton's well-executed photographs. There is also a good index.

ELECTRICAL ENGINEERING.

- (1) *Electric Circuit Problems in Mines and Factories.* By E. H. Crapper. Pp. viii+159. (London: Colliery Guardian Co., Ltd., 1910.) Price 3s. 6d. net.
- (2) *Exercises in Electrical Engineering for the Use of Second-year Students in Universities and Technical Colleges.* By Prof. T. Mather, F.R.S., and Prof. G. W. O. Howe. Pp. v+71. (London: E. Arnold, 1910.) Price 1s. 6d. net.

1) **T**HE publication of this little volume is very opportune. Although the matter does not differ essentially from that found in other books on electrical testing of circuits, the manner of presenting the subject is admirable, and particularly well adapted to the class of reader for which the book is intended, namely, the colliery or factory engineer. There is no padding and unnecessary scientific verbiage, but directness of treatment, which must be welcome to the busy engineer. In this sense the treatment may be called popular; there is only little mathematics used, and that is of an elementary character, yet there is no sacrifice of scientific accuracy.

After a short chapter dealing with the units of measurements we get a chapter on the determination of insulation resistance, including tests on live systems. Here the author might with advantage have included Russel's and other tests on three-wire systems. The following chapter, called "Circuit Testing," is mainly concerned with the location of faults on cables by bridge and potentiometric methods, the latter being preferred by the author. Then we come to the construction of cables, and what the author has to say on this subject is well worth reading.

Finally, there are some chapters on polyphase apparatus and working. The only adverse criticism which the present reviewer has to make is as to the appearance of this little book. To present so much excellent matter in so poor a guise is not doing the author justice. The paper is too thin and the illustrations are not neat. They are also of varying style, sometimes to a large scale, sometimes with fine lines, then again to a small scale, or with unnecessarily thick

lines, making no distinction between lines that are intended to represent bodily objects, and others that are merely diagrammatic. These may seem unimportant matters to the reader who sits comfortably at his well-lighted writing-table, but let him take the book down a mine to consult it while he is making a test and he will begin to appreciate thick and non-transparent paper, large type, and a systematic method in illustrating electrical connections.

(2) In this little book the authors have collected the problems and exercises set in recent years at the Central Technical College, both as regards class work and examinations. All teachers know how important exercise classes are, especially if they are conducted in a similar manner to the everyday work of the practical engineer. Now in practical work problems seldom present themselves in the definite manner in which they must necessarily be given as examples in the lecture-room; the practical problem is often involved or obscured by side issues and part of the work of the practical man is to disentangle it and separate that which really is of importance from that which is merely a small disturbing influence, or without influence at all. To present to students exercises precisely in the same way as problems arise in practical work is, of course, impossible, for it would make the questions too long, but the authors have gone as far in this direction as may reasonably be expected. The questions are such that some preliminary consideration is required on the part of the student before he can translate the wording into mathematical form, and that is excellent training for his future work.

The 427 questions contained in the book are arranged in twenty-four chapters, ranging from the elementary conception of electric circuits to machinery and apparatus in practical use. Not all the questions are set in such way that a numerical answer can be given, many can only be answered in a general way, and these are specially useful, because of forcing the student to think instead of merely to calculate by some rule learned in the lectures or copied out of an engineering pocket-book. Where numerical answers are required the solution is given in an appendix, but the authors recommend that this appendix shall only be consulted after the solution has been found, not before. Some chapters would be the better for a more extended range of problems. Thus in the chapter on commutation we miss the subjects of influence of speed, brush contact resistance, and interpoles, while great stress is laid on shifting of brushes. But nowadays most machines do not require this shifting of brushes, sparkless commutation being obtained by interpoles, contact resistance, or some sort of compensating and commutating winding. Again, in the sections dealing with A.C. generators and transformers, nothing is found on the subject of heating or the predetermination of the inductive drop. The nomenclature is also peculiar. The authors distinguish alternators as of the "copper type," "iron type," and "inductor type." The last name is generally understood, but for the first two it would be better to retain the usual designation, namely, "without iron" and "with iron" in the armature. These are, however, quite minor blemishes; on the whole the